# Micro Case 85: Yersinia Pestis

**Presentation:** 18 yr old man with 2 day history of fever, pain in left groin & diarrhea. Groin pain was so severe he walked with a limp and his left leg abducted. He also had small rashes on his leg. Lived in Arizona with good health.

Yersinia Pestis (Aka Plague)

* Nonmotile, nonspore forming
* Gram negative
* “**Safety pin shaped”-** bipolar, ovoid
* Grow well on most media & look like “fried eggs”
* Oxidase negative & ferment glucose
* Reduce nitrates to nitrites

1. Transmission

* Through flea bites after they are infected by wild rodents, carnivores, cats & dogs

1. Pathology:

* There are 3 clinical forms of plague

1. **Bubonic**- infection of lymph nodes

2**. Septicemic**- the deadliest form

3. **Pneumonic**

* Once inside human tissue, F1 glycoprotein allows the organism to survive phagocytosis & multiply in macrophages
* Virulence factors include F1 glycoprotein, a protease that activates plasminogen & degrades serum complement, a coagulase, & an exotoxin (adrenergic antagonist)
* The organisms multiply explosively & spread to lymph nodes. Nodes become enlarged- AKA “buboes”
* Dissemination occurs in the blood stream when bugs multiply & the monocytes carry them in the blood stream.
* Endotoxin with LPS stimulates systemic inflammatory response creating elevated IL-1, TNF, IL-6.
* Diffuse hemorrhages & petechial lesions are result of disseminated intravascular coagulation & vascular necrosis with septicemic plague.
* The monocytes also facilitate hematogenous dissemination of the bugs into the lungs causing interstitial pneumonic plague

1. Diagnosis

* **Direct fluorescence antibody (DFA) for F1 antigen**, a plasmid encoded glycoprotein

1. Epidemiology

* WHO reports 1000-3000 cases/year globally
* In the US there are 10-15 cases of plague/year primarily in Native Americans in the **Southwest**
* Endemic in **China, Idonesia, Mongolia, Burma & India**
* Maintained in reservoir including wild rodents, carnivores, & domestic cats & dogs
* Natural transmission of the bug is through the bite of infected fleas

1. Differential diagnosis: None of the other differentials usually cause severe systemic illness!

* Abscess
* Cat-scratch disease- look for risk factors
* Plague
* STD (chancroid, lymmphogranuloma venerum)- look for risk factors

1. Prevention:

* Must report immediately to local or state health departments
* Rodent control & avoidance with infected rodents & insecticides in suspect areas
* Once there is an epidemic, strict isolation precautions against airborne spread is necessary
* All contacts should be treated with prophylactic Tetracyclines for a week
* No longer a vaccine bc US discontinued it

Treatment:

* DOC= **streptomycin** & give it ASAP!
* Alternative drugs include: gentamicin, tetracycline, & chloramphenicol